STUDENTS' PERCEPTIONS OF THE USE OF THE VIRTUAL PATIENT RECORD (VPR) APP FOR PHARMACY EDUCATION

Kevin Yi-Lwern YAP
Department of Pharmacy

Introduction

In 2009, the Obama administration passed the Health Information Technology for Economic and Clinical Health Act, committing up to $27 billion worth of incentive payments to clinicians and hospitals to encourage greater adoption and use of electronic health records (EHRs) (Blumenthal & Tavenner, 2010). Although the benefits of EHRs—increased completeness and accuracy of patient information, better clinical decision support and electronic prescribing, and greater medical practice efficiency—have been well-documented (Menachemi & Collum, 2011; Clay, 2012; HealthIT.gov, 2015), the adoption and acceptance of EHR technology in clinical pharmacy practice has been poor (Li, Land, Ray, & Chattopadhyaya, 2010). One reason could be that the implementation of EHRs disrupts the usual workflow processes in clinical environments, and many pharmacists had difficulty extracting relevant and accurate patient information from the EHR systems (Wang & Huang, 2012). This unfamiliarity with EHR systems could be attributed to the pharmacists not being trained to use the systems when they were students (Guile & Ahamed, 2011). During a review of the pharmacy practice curriculum conducted in the Department of Pharmacy in July 2012, the faculty felt that there was a need to expose students to the basic workings of an EHR system and the types of patient- and drug-related information it contains. Such exposure would address the learning gaps observed, and the information retrieved from the EHR system would be relevant for patient counselling and dispensing, which would ultimately ensure undergraduate pharmacy students make a smoother transition towards clinical practice. With smartphone technology gaining acceptance and increasingly being adopted by students, mobile applications (apps) could be a potentially viable and authentic learning platform for our pharmacy students to familiarise themselves with the workings of EHR systems. Although there are apps available in the Apple iTunes and Google Play stores which have been developed as educational tools for healthcare students, none of them contain EHR features (Mosa, Yoo, & Sheets, 2012; Handel, 2011).

This pilot study aims to determine the perceptions of a group of Year 4 (final year) pharmacy undergraduates on the usefulness of a virtual patient record (VPR) mobile app prototype, developed as a tool to support their learning. The VPR mobile app serves to educate students on the types of patient health information (PHI) available from EHRs to supplement their pharmacy practice curriculum.

Creating the VPR Mobile App Prototype

Features

The VPR mobile app prototype consists of two core features, the "Patient Health Records (PHR)" and "Case Questions", as well as two supporting features, "Statutes" and "Useful Links" (see Figure 1). Fictional patient records containing the PHI were incorporated into the PHR feature. The types of PHI were categorised into "Social Data", "Medical History", "Prescription History", and "Lab Data", while the "Case Questions" feature contained clinical case scenarios. Web links to the governmental statutes of Singapore (e.g. the Medicines Act, the Poisons Act, and the Misuse of Drugs Act) were included in the "Statutes" feature. Meanwhile, web links to other professional websites (e.g. Singapore Pharmacy Council, Pharmaceutical Society of Singapore, and the Department of Pharmacy, NUS) were incorporated within the "Useful Links" feature.
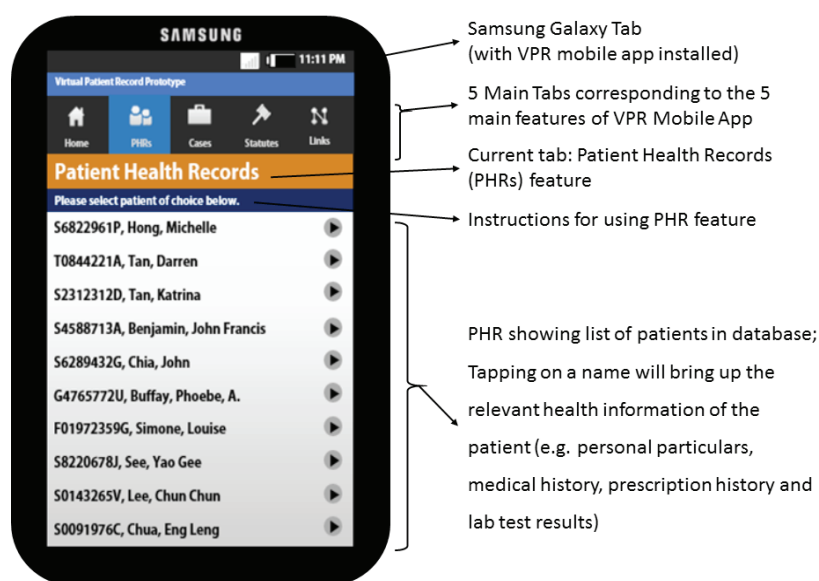

Figure 1. Graphical user interface of the VPR mobile app prototype, as seen on the Samsung Galaxy Tab.

Development process

The graphical user interface of the VPR mobile app prototype was conceptualised on storyboards using Microsoft PowerPoint 2013, from which an Android version of the app was created. Mock patient records[1] created for training purposes were uploaded into a local backend database and integrated into the app's PHR feature to simulate an EHR. The app was installed locally on two Samsung Galaxy Tab devices for the pilot study.

Study Design

The VPR mobile app prototype was used within a Year 4 undergraduate pharmacy practice module for 4 weeks from March to April 2013. Classes were held once every week where students had to participate in mock counselling sessions, where they engaged in one-to-one role play which mimicked real-life patient encounters. They then had to use the app to solve these clinical cases. Following the role play, students had to complete an online survey in which they had to indicate their perceptions of the app's usefulness for pharmacy education, and its relevance as an EHR simulation tool. Overall usability of the VPR mobile app prototype was assessed based on a scale of 1 ("not useful at all") to 10 ("extremely useful"). Additionally, qualitative feedback was sought on how the app could be improved. A total of 31 students were involved in the pilot study, and all of them participated in the survey.

Results

Students' perceptions regarding the usefulness of the VPR mobile app for pharmacy education

The general response towards the VPR mobile app prototype was positive, with 100% of the respondents agreeing that it was easy to search for PHI relevant to the case questions. Most of them felt that the designs for the app's features were understandable and self-explanatory (96.7%), and that the graphical user interface made it easy to navigate within the app (93.5%). 100% of the respondents found the PHR to be the app's most useful feature, followed by "Case Questions" (83.9%), "Statutes" (57.1%), and "Useful Links" (48.4%). Overall, 28 students (90.3%) found the app useful as a teaching aid, and 87.1% of the respondents gave a rating of at least 7 out of 10 for the usefulness of the app as a teaching aid for pharmacy practice education.

Students' suggestions on how the VPR mobile app can be refined and implemented in other pharmacy modules

A majority of the students indicated that the app had the most potential to be implemented in the following modules: pharmacology and pharmacotherapy (90.0%), pharmacy law (81.0%), health communications skills (74.0%), and pharmacokinetics (58.0%). Over half of the respondents also suggested that additional features be included in the app, such as revision and supplementary materials from lectures (61.3%), practice quizzes/questions, and lesson updates (54.8% each).

Discussion

In this study, the "Statutes" and "Useful Links" features were deemed less useful by respondents (compared to "PHR" and "Case Questions"), with respectively only 57.1% and 48.4% finding them useful. This could be because the respondents, who were Year 4 (final year) pharmacy students, had previously undergone several modules on pharmacy-related law and good clinical practices in their curriculum, and were more likely to refer to their lecture notes instead. Nevertheless, half of the respondents felt that "Statutes" and "Useful Links" were still useful features for the app. One of the respondents suggested that the app be implemented earlier in their Year 1 and Year 2 modules so as to introduce undergraduates to the concept of EHRs and how to apply the information they retrieve from this system to clinical practice. In fact, the respondent added that students should be familiar with the app before their hospital preceptorship attachments, which occur during the mid-term holidays in Year 3, by which time the app's usefulness to pharmacy education would become more obvious to them.

In order to help students keep abreast of the latest medical-related news and developments, websites that provide relevant health- and medication-related information (e.g. Medscape), and useful materials for continuing professional education (e.g. American Society of Health-system Pharmacists and the Royal Pharmaceutical Society of Great Britain) will also be included in the "Useful Links" feature. This would make the app more useful and relevant in the pharmacy practice curriculum.

Limitations and Future Plans

The main limitation of the app was that it lacked a security login feature to prevent unauthorised access to the case questions, hence it was locally installed on two tablet devices owned and provided by the facilitator. This also limited the number of students to only a small group who could utilise the app at any time during the counselling sessions. In addition, only one source of data was obtained for this pilot study. Data collected from other sources, such as focus group interviews with students and video recordings of mock up counselling sessions, could better support the findings.

To overcome these limitations, future plans to enhance the VPR mobile app include incorporating a login function tagged to the institutional login identities of students and facilitators, as well as migrating its access to the mobile web. This enhancement would mean that the app can be tested on a larger sample of students in their earlier undergraduate years and in other pharmacy practice modules. Besides surveys, the facilitator may consider collecting additional user feedback data through focus group interviews to ascertain the usability of the app, as well as identify and address any potential reliability issues.

Future developments of the VPR mobile app will also consider its use on a variety of platforms, including Android, the Apple iOS (operating system) and the newer Microsoft Windows 10 platform. Another possible refinement would be to migrate the app's features to a cross platform-based medium, such as the mobile web as mentioned earlier, to cater to the general student population and address the issue of students' unfamiliarity with the app. Besides the advantage of the mobile web version having a uniform look and feel (which can have a positive impact on students' usability experience), it is also easier to maintain and sync any updates to the app across all platforms. This would yield savings on logistics and manpower. In addition, students can access the app from the browsers on their mobile devices without having to download and install the app onto their smartphones.

Conclusion

Technological advances and innovations in the educational arena are changing the landscape of pharmacy education. The lack of EHR-related intended learning outcomes in our pharmacy curriculum presents itself as a potential aspect of pharmacy education which we can improve, and there is a need to look into the feasibility of including them in our course curriculum. With a student population that is increasingly tech-savvy, there is great potential for educators to utilise mobile apps as learning tools for pharmacy students. The high student feedback ratings given for the VPR mobile app's usefulness as a teaching aid for practice education in this pilot study suggest that it has been successfully implemented as a tool which gives pharmacy students much-needed exposure to the workings of an EHR and the types of PHI that are relevant when dealing with clinical patient encounters. An opportunity also exists for the Department of Pharmacy to leverage on this app and explore how it can be used in other modules to enrich students' learning experiences. Although there is still room for improving some features of the app, I hope in subsequent semesters to incorporate its use in the early segments of the undergraduate pharmacy practice curriculum, so as to ease the transition process of our graduating pharmacists to becoming healthcare professionals.

Endnote

1. As mock patient records were created for training purposes and uploaded into the app's PHR feature to simulate an EHR system, it eliminated any security concerns regarding access to confidential patient data. Furthermore, the app was isolated from the hospital's EHR records and did not tap into any real patient records. As such, the app can be used for pharmacy education without any risk of compromising patient privacy and confidentiality.

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About the Author

Dr. Kevin Yap is a cyber-pharmacist and an interdisciplinary researcher at the Dept of Pharmacy. He strongly believes in a blended form of learning for students which combines digital education and authentic learning environments. His educational research interests focus on e-learning and e-assessments, mobile and games-based learning, and how such technologies can enhance students' learning and build up their domain-related knowledge and skills. He has led several initiatives in promoting the use of technology in pharmacy education through using the university's e-assessment platform, initiating a YouTube channel, and creating a virtual pharmacy game for clinical practice and skills training.